

CREDIT-BASED ADAPTIVE FLOW CONTROL FOR MULTI-STAGE MULTI-
DIMENSIONAL SWITCHING ARCHITECTURE

ABSTRACT OF THE INVENTION

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10 The novel credit-based adaptive flow control method
and system for multi-stage, multi-dimensional, data
switching architecture. The method and system of the
present invention estimates and balances data flow in the
switch architecture by using statistical information
derived from the normal switching operation without
requiring specific information from the previous stage.
The multi-stage multi-dimensional switching architecture of
the present invention includes three stages. The first and
15 third stages are the buffering stages, and the second stage
acts as a buffer-less crossbar switch node. Each stage
includes an array of switching elements, and each element
includes either a queuing processor or an arbitration
processor arranged to progressively refine estimates of the
20 data traffic from switch elements in the first stage by the
second stage. The second stage maintains the statistic of
valid traffic arrival and departure, and feedback grant
information bit to the first stage. The first stage treats
every grant information as credit for each data departure
25 to the second stage, and sends the data if there is a grant
credit available. The adaptive filtering process adjusts a
threshold adaptively, rendering the statistical properties
to resemble a chosen probability distribution.